



Self-control and debt decisions relationship: evidence for different credit options

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Abstract

In recent years, households have become increasingly indebted, which constitutes a matter of concern. Based on a sample from the Spanish *Survey of Financial Competences*, this paper examines the relationship between self-control and consumer borrowing behaviour and, in so doing, it proposes a new multi-item scale of individual's self-control in financial matters and considers several types of consumer debt, thus overcoming the main gaps identified in previous research. Empirical evidence reveals that, overall, self-control problems lead to more indebtedness. However, comprehensive analyses have demonstrated that the influence of self-control differs across an exhaustive range of credit options. In this regard, the lack of self-control increases the probability of taking out unsecured personal loans, loans from family or friends, and credit card use. Evidence suggests that individuals' first impulse leads them to ask their social circle for a loan. Overall, individuals might be tempted to get indebted when they cannot make ends meet. However, this first impulse usually faces barriers from the supply perspective, so the evidence suggests that the effect of self-control on borrowing decisions might be shaped not only by the demand side of credit but also by the supply one.

Keywords Household indebtedness · Consumer debt · Behavioural finance · Exploratory Factor Analysis · Self-control · Credit

JEL classification codes G41 · G51

Introduction

Most developed economies have experienced a sharp increase in household debt, also known as the 'democratisation of credit' (Kukk, 2019), with continually rising

insolvency levels over the past two decades (König & Gröbl, 2014). This unprecedented rise in household debt not only increases the financial vulnerability of households but also makes the occurrence of financial crunches more likely (Faria et al., 2012). The current situation is not particularly encouraging due to the growing levels of indebtedness of European households after the Great Recession of the 21st century (Angel & Heitzmann, 2015). Thus, in 2017, household debt represented 110.8% of household net disposable income in Spain, reaching 246.2% in the Netherlands (OECD, 2019).

Household borrowing is a complex phenomenon influenced by several processes. In this regard, previous studies have acknowledged the effect of psychological and attitudinal traits in explaining individuals' borrowing behaviour (Achtziger et al., 2015). Among these traits, self-control has emerged as one of the driving forces behind financial decisions (Gathergood, 2012) and, particularly, household debt. An emerging stream of the literature in this area has found evidence that a lack of self-control increases debt-holding by

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encouraging individuals with time inconsistency problems to make impulsive decisions concerning money. Hence, the literature's understanding of why household debt has sharply increased in recent years is essential for sound policymaking (Faria et al., 2012).

To date, research connecting household indebtedness to self-control is still underdeveloped. Only a few studies (Achtziger et al., 2015; Gathergood, 2012; Gathergood & Weber, 2014; Wang et al., 2011; Webley & Nyhus, 2001; Wilcox et al., 2011) have explicitly addressed this issue.

Two major limitations exist in previous research. Firstly, the extant studies analyse either a specific type of debt or an aggregate measure of household debt. However, no study explores the influence of self-control on several types of household debt. Secondly, the self-control measures adopted in those studies suffer from specific weaknesses, such as the use of measurement scales based on a limited number of items (e.g., Gathergood & Weber, 2014); or based on general behaviours, such as smoking or drinking, rather than on financial choices (e.g., Achtziger et al., 2015; Wang et al., 2011). Moreover, most of the studies on this topic overlook the role played by financial literacy in household debt, even though a strand of the literature has acknowledged that low levels of financial literacy are associated with a costly use of debt (Lusardi & Tufano, 2009).

Nonetheless, this study goes beyond previous research. Firstly, our evidence identifies that a lack of self-control causes individuals to become more indebted and that the impact of self-control on borrowing behaviour is greater among those individuals displaying the lowest levels of self-control. Secondly, empirical evidence confirms that the effect of self-control differs depending on the type of debt. These differences seem to rely more heavily on the borrowing constraints of the supply side of credit than on the demand side (i.e., the individual).

This study aims to address the gaps mentioned above. Drawing mainly on the behavioural life cycle (BLC) hypothesis, it analyses whether individuals' self-control in financial matters affects their borrowing behaviour across different types of debts. To this end, in the first stage, the authors design and validate a multi-item scale of financial self-control; the scale is validated using Exploratory Factorial Analysis (EFA). In a recent study, Nilsen et al. (2020) acknowledge that most existing measures of self-control are limited, as they fail to consider the multidimensionality and specificity of the trait or situation to which they are applied. Besides, these measures are mostly designed to measure a general trait of self-control instead of the concept as a whole (Lindner et al., 2015). The development of this new scale facilitates the more efficient measurement and prediction of results as the

statements on self-control refer to individual behaviours regarding financial choices rather than general behaviours. In the second stage, the authors consider up to nine types of household and individual debts and explore whether the effect of self-control differs across them. Moreover, all the estimated models include financial literacy as a control variable.

This study contributes to the literature in the following ways. Firstly, it extends the existing theoretical literature on self-control and household debt by demonstrating that the effect of self-control varies depending on the type of debt. Secondly, the study proposes a new multi-item measure of self-control within the financial domain. This study responds to the claim that a more financial-oriented self-control measure is needed when examining financial matters (Lown, 2011). Thirdly, it also complements previous empirical evidence since the analysis relies on a much broader sample than previous studies, namely one consisting of 8,554 Spanish individuals, which allows the study to not only obtain more robust and generalisable results (Farrell et al., 2016) but also control for a rich set of household and individual characteristics such as financial literacy. Finally, our evidence contributes to the empirical literature on consumer finance by demonstrating that individuals' behavioural characteristics (and particularly, self-control) have significant impacts on individuals' borrowing decisions, thus contributing to knowing the driving forces of indebtedness decisions and allowing to make meaningful recommendations aimed at improving household debt behaviours and preventing over-indebtedness.

The paper is structured as follows: Sect. "Literature review" addresses the literature review; Sect. "Data" describes the data; Sect. "Econometric model and estimation" presents and discusses the findings resulting from the multivariate analysis; and Sect. "Discussion" ends by summarising the concluding remarks.

Literature review

The construct of self-control has been conceptualised differently, but regardless of its conceptualisation, there is consensus on how it is defined (Mansfield et al., 2003). Self-control can be defined as individuals' ability or capacity to control their own states, responses, emotions, or impulses to protect a valued goal or resist a temptation (Gerhard et al., 2018). Individuals' capacity for self-control can vary and thus affect their future financial well-being, as those with self-control problems are less willing to save for the future and more willing to spend in the present (Mpaata et al., 2021; Thaler & Benartzi, 2004). Self-control has often been considered an intrapersonal decision time-inconsistency problem

(Gathergood, 2012; Zhao et al., 2021) by the behavioural finance approach. Accordingly, it is generally accepted that a lack of self-control leads individuals to fall into their first or dominant impulses, namely, the inability to resist temptations or cope with their emotions.

The dilemma of self-control is between choosing the here and now or postponing something to an uncertain future, that is, dealing with the trade-off between instant rewards and long-term interests, hence its connection with the BLC hypothesis. Indeed, as Strömbäck et al. (2017) point out, according to the above-mentioned theoretical hypothesis, individuals behave as if within each person, there is an ongoing conflict between a “planner” who is more concerned about the long term and a “doer” who is more concerned with the present time. According to this, individuals are torn between worrying about getting things done now or planning for the long term, assuming the temptation to spend is greatest for current income and lowest for future income (Shefrin & Thaler, 1988). Thus, these authors incorporate self-control in the BLC hypothesis, considering self-control as a prospective antecedent of households’ saving and consumption decisions. In this perspective, individuals face an internal conflict and might not be rational in their decisions. Here, self-control emerges as a driving force aimed at controlling individuals’ first impulses regarding consumption behaviour to foster savings. Thus, the ability to control impulses and emotions can influence individuals’ decision-making (Atkinson & Messy, 2011), enabling them to manage their finances successfully (Farrell et al., 2016).

Whilst extant theory has acknowledged the importance of self-control as a significant driver of financial behaviour since the 1980s (Shefrin & Thaler, 1988), the empirical literature on the issue remains scarce. This could partly be because, until recently, there has been a lack of multidisciplinary datasets (i.e., datasets gathering information on both psychological traits – such as self-control – and financial decisions). Hence, only recently have a number of studies analysed in more detail the role of self-control in financial decisions. These studies have emphasised two main specific financial behaviours: household (e.g., Liu et al., 2019; Thaler & Benartzi, 2004) and retirement savings (e.g., Ameriks et al., 2007; Hira et al., 2009; Kimball & Shumway, 2009); and household debt (e.g., Bu et al., 2022; Gathergood, 2012; Wang et al., 2011).

This section continues to present the most relevant contributions in the field, thus motivating the gaps in the literature that are tackled throughout this paper. To the best of the authors’ knowledge, Webley and Nyhus (2001), Wang et al. (2011), Gathergood (2012), Gathergood and Weber (2014), and Achtziger et al. (2015) are the only studies that have explicitly addressed the relationship between self-control and household debts (Table 1).

Thus, Webley and Nyhus (2001) find that a lack of self-control causes individuals to get into more debt. Their empirical evidence is based on a sample of 4,147 Dutch individuals. Self-control is measured through three indexes: two are related to health and healthy habits, and one is focused on spending styles. In turn, debt is examined through an aggregate measure that combines information regarding arrears, bank debt, the extent of credit, self-reported financial situation, perceived creditworthiness, and the stated relationship between income and expenditure.

Wang et al. (2011) investigate a sample of 837 Chinese credit card holders. Attention is paid to the effect of self-control on credit card usage, finding that self-control is negatively associated with revolving credit use. Those authors employ a multi-item psychological scale to measure self-control and consider it a personality factor. Using the same self-control scale and a sample of 946 German individuals, Achtziger et al. (2015) conclude that self-control negatively affects consumers’ current debts, measured through an aggregate index of private loans, general bank loans, and other debts. Furthermore, Wilcox et al. (2011), based on five experimental and field studies, find evidence that consumers with high self-control increase spending when the available credit on their credit card is low. However, consumers decrease spending when the available credit is high. In so doing, they use a general measure of self-control based on a 13-item scale capturing individuals’ overall tendency to exercise restraint in different domains.

Gathergood (2012) identifies that a lack of self-control increases household over-indebtedness in a sample of 1,234 United Kingdom (UK) households, increasing their financial vulnerability and exposition to financial shocks. Namely, this author confirms that those individuals with self-control problems make greater use of quick-access but high-cost credit items such as payday loans. To measure the level of self-control, Gathergood (2012) employs a single statement aimed at discovering whether the respondents act impulsively regarding financial choices. Using the same statement and based on a larger sample comprised of 2,584 UK households, Gathergood and Weber (2014) find that low levels of self-control increase the co-holding (i.e., the simultaneous holding of consumer credit and liquid assets) and consumer borrowing. It is noteworthy that, unlike previous studies, Gathergood (2012) and Gathergood and Weber (2014) consider the influence of financial literacy on household borrowing. This represents a significant contribution, given that plenty of studies have proven that individuals’ financial literacy conditions their debt status (Agarwal et al., 2010; Collard et al., 2012; Disney & Gathergood, 2013; French & McKillop, 2016; Lusardi & Tufano, 2009; Servon & Kaestner, 2008; Sevim et al., 2012).

Similarly, Meier and Sprenger (2010) concluded, after a field study, that present-biased individuals are more likely to

Table 1 Studies on self-control and household debts

Authors	Sample	Year of the sample	Dependent variable: <i>debts</i>	Key independent variable: <i>self-control</i>	<i>Financial literacy</i> as a control variable
Webley and Nyhus (2001)	4,147 Dutch individuals (households' heads, together with their spouses or partners)	1994, 1995, 1996	An aggregate measure that combines information on (HOMALS analysis): - Arrears - Bank debt - Extent of credit - Self-reported financial situation - Perceived credit worthiness - The stated relationship between income and expenditure	Three indexes: - First index. Spending styles (from 'I like to spend all my money immediately' to 'I want to save as much as possible') - Second index composed by two items: weight and height - Third index composed by three questions on smoking and drinking	No
Wang et al. (2011)	837 Chinese individuals (credit card holders)	2008	Two specific behaviors: - Revolving credit use (one index through the average of four items) - Petty instalment credit use (one index through the average of four items)	Eleven self-reported items based on a previous scale	No
Gathergood (2012)	1,234 UK households	2010	Three measures of over-indebtedness: - Self-reported measure of over-indebtedness through three items - One-month delinquency on at least one credit item - Three-month delinquency on at least one credit item	Three self-reported items	Yes. Three questions on: - Simple interest - Compounding interest - Monthly payments
Gathergood and Weber (2014)	2,584 UK households	2010	One question regarding co-holding	A single item which describes impulsive behavior (i.e. the lack of self-control)	Yes. Three questions on: - Simple interest - Compounding interest - Minimum payments
Achtziger et al. (2015)	946 German individuals	-	An aggregate measure resulting from the consideration of the amounts of: - Private loans - General bank loans - Other debts	An index resulting from a sum of the scores of a scale of eleven self-reported items	No

borrow and, conditionally, to have a more significant amount of credit card debt.

In short, the aforementioned studies acknowledge that self-control impacts household debt. Along this line of thinking, our first hypothesis is proposed:

Hypothesis A: The lower the individuals' level of self-control, the greater their probability of getting into debt.

Nevertheless, as mentioned above, two major gaps exist in the research examining the relationship between self-control and borrowing behaviour. Firstly, previous studies have failed to distinguish between different types of debt. Thus, Wang et al. (2011) and Wilcox et al. (2011) both considered exclusively credit card debt, and Gathergood (2012) focused on over-indebtedness. In contrast, Webley and Nyhus (2001), Gathergood and Weber (2014), and Achtziger et al. (2015) aggregated different measures of debt into a single one. This paper goes beyond these studies, proposing that the effect of self-control may differ according to the type of debt, as each has its specific features. Although there is no evidence regarding self-control, previous studies have shown that attitudinal factors have a different influence on the use of money or the debt incurred. Namely, Wang et al. (2011) ascertained that attitudes and, more specifically, dimensions of attitudes differently influence individuals' behaviour towards credit cards or other types of debt. Loibl et al. (2021) show that the type of attitude towards debt also influences how individuals behave towards the use or non-use of revolving credit. The underlying argument here is that different types of debt involve different levels of difficulty in both access to credit and repayment conditions. Thus, the first impulse of an individual with self-control problems might be to borrow from family and friends because it is expected that they would offer better repayment conditions than those offered by the financial sector (i.e., lower or zero interest rates and flexible repayment schedules). However, when the individual does not have this choice, the alternative may be to take out a bank loan to make ends meet. In such cases, they are conscious that this choice is subjected to financial scrutiny and risk assessment by bank officers. Hence, this first impulse can be re-directed to 'easier' ways of indebtedness, such as using existing credits or borrowing from employers.

Hypothesis B: The relationship between individuals' self-control and borrowing behaviour will depend on the type of debt considered (i.e. individual vs household debt).

Secondly, there is a lack of agreement regarding measuring self-control. In most studies, self-control refers to general behaviours (Achtziger et al., 2015; Wang et al., 2011; Webley & Nyhus, 2001) rather than to financial matters. Only Gathergood (2012) and Gathergood and Weber

(2014) constructed a measure relying on individual behaviour regarding financial choices. In addition, these authors consider financial literacy as a control variable.

Data

Survey and sample characteristics

The data used in this study comes from the *Survey of Financial Competences* (Banco de España and CNMV, 2018), a questionnaire-based survey integrated into the 'Measuring Financial Literacy and Financial Inclusion' initiative of the OECD's *International Network of Financial Education* (INFE). The analysis is based on a dataset comprised of 8,554 Spanish individuals between 18 and 79 years of age. Data collection occurred between the fourth quarter of 2016 and the second quarter of 2017. The survey assesses the financial knowledge, behaviours and attitudes of a representative sample of the Spanish population, gathering information on its personal and demographic characteristics. This information allows the study to use a rich set of demographic and socio-economic characteristics often highlighted by the literature as driving forces of household borrowing. Table 2 describes the set of independent variables used.

Another advantage of using the *Survey of Financial Competences* is that it contains detailed information about individuals' financial competences. Indeed, this is the only survey that allows its assessment of the Spanish population. As mentioned previously, apart from Gathergood (2012) and Gathergood and Weber (2014), none of the extant studies have paid attention to this potential driver.

Table 3 summarises the socio-economic and demographic characteristics of the sample. Evidence shows that 50.2% of respondents are women and the average age of the sample is close to 47 years. Additionally, 65.7% of respondents are married, and 30.7% have children younger than 18 years living at home. Regarding educational attainment, 27.2% completed the first stage of secondary education, 22.8% the second stage of secondary education, and 22.3% undertook university studies. Regarding employment status and economic situation, 53.1% of the respondents are employed or self-employed, and almost half of the sample (50.5%) has a yearly household gross income between 14,500 and 45,000 euros.

Finally, the three-item measure of respondents' financial literacy is constructed based on the 'core' of financial literacy and stems from three questions developed by Lusardi and Mitchell (2011a). These questions refer to the concepts of interest compounding, real and nominal returns, and portfolio diversification. Hence, the financial literacy measure consists of four levels, which reflect the number of questions a respondent can answer correctly, ranging from 0 if

Table 2 Definition of independent variables

Variable	Definition
Gender	Dummy variable on the respondent's gender: female (1); male (0)
Age	Continuous variable: logarithm of the respondent's age in years
Employment status	Categorical variable on the respondent's employment status: (1) employed or self-employed [reference category]; (2) unemployed; (3) retired; (4) another situation
Income level	Categorical variable on the total annual gross income of the household: (1) < €14,500 [reference category]; (2) €14,500–45,000; and (3) > €45,000
Educational attainment	Categorical variable on the highest level of formal education of the respondent: (1) no formal education [reference category]; (2) completed primary education; (3) first stage of secondary education; (4) second stage of secondary education; (5) technical/vocational education; (6) university education
Dependent children	Dummy variable: the respondent normally lives in his/her household with either his/her own children under the age of 18 or those of his/her partner/spouse (1); otherwise (0)
Marital status: married	Dummy variable on the respondent's marital status: the respondent usually lives in his/her household with his/her partner/spouse (1); otherwise (0)
Financial literacy	Categorical variable, ranging from 0 to 3 [0 being the reference category], on the number of correct answers to the following three questions on financial literacy: (a) Let's suppose you deposit €100 in a savings account with fixed interest of 2% per annum. In this account there are no commissions or taxes. If you make no deposit or withdrawal, once the interest has been paid to you how much money will there be in the account after five years? [Over €110/Exactly €110/Less than €110/it is impossible to say with the information given/Other answers] (b) It is usually possible to reduce the risk of investing in the stock market by buying a wide range of stocks and shares [True/False] (c) Imagine that five siblings had to wait a year to obtain their share of €1,000, and that inflation that year was 1%. Within one year they will be capable of buying... [More than they could today with their share of money/The same amount/Less than what they could buy today/...]
Self-control	Continuous variable on the respondent's self-control constructed by applying the EFA (see Sect. " Measures of financial self-control " for more information) Two additional variables on self-control (i.e. the dummy variable <i>SELFC_D</i> and the categorical variable <i>Q#.SELFC_D</i>) were defined

all answers are wrong to 3 if all three answers are correct. Thus, 13.3% of respondents failed to correctly answer any of the three questions proposed by Lusardi and Mitchell (2011b), and only 18.9% answered all questions correctly. Most respondents can correctly answer one or two of the three questions on financial literacy.

Measures of household debts

Unlike the studies summarised in Table 1, this paper measures household borrowing behaviour through different types of consumer debt. The *Survey of Financial Competences* contains detailed data on household consumer debts throughout its different sections, leading to the definition of up to nine dependent variables, that are described in Table 4 and subsequently considered in the empirical analyses.

Thus, in a specific section related to the financial products held by households, the respondents answer whether they '(personally or jointly) currently hold an unsecured bank loan/a credit card'. Two dummy variables were created: one related to unsecured personal loans and the other to credit card debt.

It is noteworthy that holding a credit card does not necessarily imply credit card usage. Similarly, compared to

other developed economies, the number of credit cards in Spain has sharply increased in recent years due to, among other factors, the increase in the number of points of sale (POS) terminals in commercial establishments, the possibility of paying without a minimum cost, the growth of online purchase, and the development of contactless payment systems. Thus, in 2017, the Spanish population held 52.35 million credit cards; a non-negligible figure compared to 43.49 million in 2007, the year before the global financial crisis started (Banco de España, 2022). However, from 2017 onwards, credit card holding declined to 38.55 million in 2021, while debit card holding rebounded to 49.44 million. Credit cards were mainly used for deferred payments (Banco de España, 2019) rather than as 'pure credit cards'. In sum, the previous facts lead us to consider that credit card holders are likely those who least need to borrow.

Seven additional dependent variables were created to distinguish between individuals 'entitled to hold debts' and 'actual borrowers'. These variables were taken from the 'Expenditure and financial fragility' module of the *Survey of Financial Competences* questionnaire. Namely, the dependent variables were created based on some of the possible answers to the following question: 'What did you do to make ends meet the last time this [i.e., *income did not cover your*

Table 3 Socio-economic and demographic characteristics of survey respondents

Variable		Obs.	Mean	Std. Dev.
Gender: female		8,554	0.502	0.500
Age		8,554	47.225	15.774
Employment status	Employed or self-employed	8,553	0.531	0.499
	Unemployed	8,553	0.138	0.345
	Retired	8,553	0.161	0.367
	Another situation	8,553	0.169	0.375
Income level	< 14,500€	7,720	0.361	0.480
	14,500–45,000€	7,720	0.505	0.500
	> 45,000€	7,720	0.134	0.341
Educational attainment	No formal education	8,552	0.024	0.152
	Completed primary education	8,552	0.150	0.357
	First stage of secondary education	8,552	0.272	0.445
	Second stage of secondary education	8,552	0.228	0.419
	Technical/vocational education	8,552	0.104	0.305
	University education	8,552	0.223	0.417
Dependent children		8,551	0.307	0.461
Marital status: married		8,551	0.657	0.475
Financial literacy	All answers are wrong	8,303	0.133	0.339
	One correct answer	8,303	0.335	0.472
	Two correct answers	8,303	0.343	0.475
	Three correct answers	8,303	0.189	0.391

In the case of dummy and factor variables, the value of the mean reports the percentage of people who fulfil the condition according to which those variables take the value equal to 1. Age variable is not expressed as a logarithm. *Obs.* and *Std. Dev.* stand for *the number of observations* and the *standard deviation*, respectively

Table 4 Definition of dependent variables

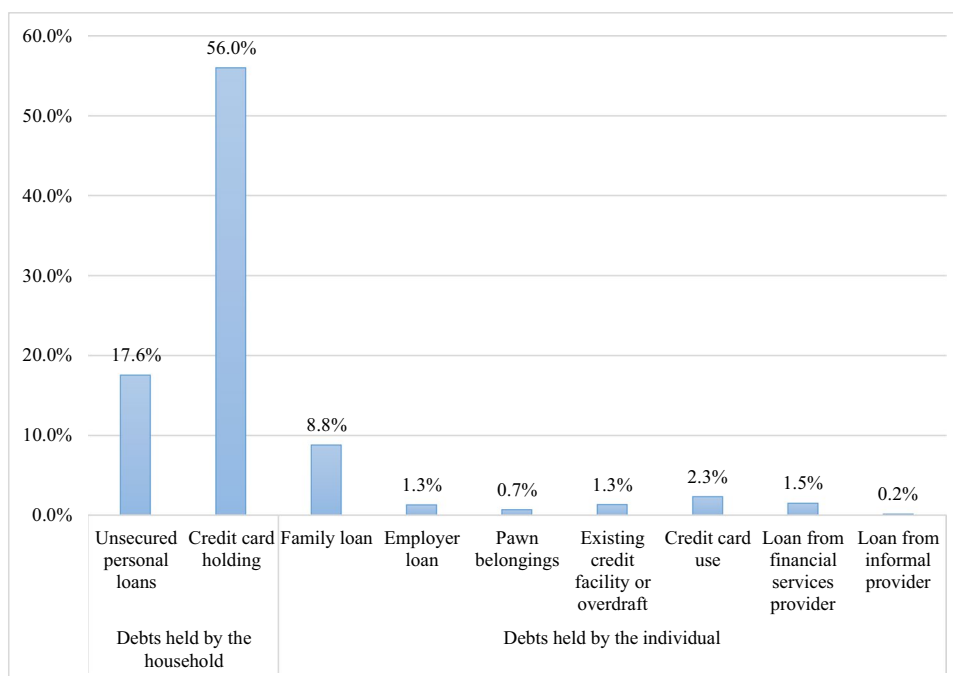
Variable	Definition
Unsecured personal loan	Dummy variable: the respondent has, personally or jointly, an unsecured personal loan (1); otherwise (0)
Credit card holding	Dummy variable: the respondent has, personally or jointly, any credit card such as <i>Visa</i> , <i>Mastercard</i> , <i>American Express</i> ... (1); otherwise (0)
Family loan	Dummy variable: the respondent has borrowed from family members or friends (1); otherwise (0)
Employer loan	Dummy variable: the respondent has asked for an advance or has obtained a loan from his/her employer (1); otherwise (0)
Pawn belongings	Dummy variable: the respondent has pawned his/her belongings (1); otherwise (0)
Existing credit facility or overdraft	Dummy variable: the respondent has drawn down an existing credit facility, or has used an authorised overdraft (1); otherwise (0)
Credit card use	Dummy variable: the respondent has used a credit card for cash advances, to pay bills, or to buy food (1); otherwise (0)
Loan from financial services provider	Dummy variable: the respondent has taken out a personal loan from a financial services provider, including banks, credit unions... (1); otherwise (0)
Loan from informal provider	Dummy variable: the respondent has taken out a loan from an informal provider/lender (1); otherwise (0)

living expenses] happened?'. The interviewees can choose the option of getting into debt, allowing the questionnaire to select among different types of indebtedness (e.g., borrowing from family and friends, pawn belongings, drawing down an already existing credit facility...).

Table 4 defines these seven dependent variables and the two additional ones focused on credit card holding and

credit card use. Figure 1 depicts the percentage of survey respondents with each type of debt, differentiating two categories: (a) debts held by households; and (b) debts held by individuals. Concerning the former, 56% of households have at least one credit card, and 17.6% have an unsecured bank loan. Concerning the latter, only 0.2% of individuals have obtained a loan from an informal provider (or

Fig. 1 Percentage of survey respondents by type of debt



moneylender), and 0.7% have pawned some belongings. Regarding credit granted by financial providers, 1.5% have applied for a new credit line, 1.3% have drawn down an existing credit line or used an authorised overdraft to make ends meet, and 2.3% have borrowed from an existing credit card. Finally, concerning other loans, 1.3% of the sample have borrowed from their employers or have asked for an advance, and 8.8% have asked for money from close relatives (family members or friends).

Measures of financial self-control

As previously mentioned, the main independent variable deals with the individual's level of self-control. Previous studies have employed measures of self-control based on general behaviours rather than on financial matters (e.g., Achtziger et al., 2015; Wang et al., 2011). To construct a measure of self-control in financial matters, an EFA was carried out.

In this regard, the *Survey of Financial Competences* assesses financial attitudes by asking individuals to identify the extent to which their behaviour corresponds to that described in several short statements. According to Ameriks et al. (2007) and Gathergood (2012), the selected statements should specifically refer to individual behaviours concerning financial choices rather than general behaviours to obtain a financial-oriented measure.

The statements that compose the latent dimensionality of self-control are the following ones:

- (1) *'I tend to live for today, without thinking about the future.'*
- (2) *'I prefer spending money now to saving it for the future.'*
- (3) *'Money is there to be spent.'*

The answer options range from 1 (completely agree) to 5 (completely disagree). Following Gathergood (2012), the first statement could be labelled as a 'heavy discounter' statement, whereas the other two statements reflect impulsive spending behaviour ('impulsiveness' statements).

In our sample, 18.3% of respondents agree or fully agree with living for today without overthinking about the future; 14.4% agree or completely agree that it is more satisfying to spend money than to save it for the long term; and 38.7% report that money is there to be spent. Gathergood (2012) reported that 9.2% of UK respondents agree or totally agree with the 'impulsiveness' statement. However, in this study, the percentage of Spanish individuals that agree with any of the two 'impulsiveness' statements is much higher.

Exploratory Factor Analysis (EFA) and, particularly, principal component assessment is used as an extraction methodology to simplify the factor structure. Varimax is used as a rotation method. The commonalities were above 0.53, which suggests that the items effectively describe the variance of the original items. The factor explains 58.43% of the scale total variance, and the items have loadings ranging from 0.73 to 0.80. To contrast the internal consistency of the scale, following the recommendations of Trizano-Hermosilla and Alvarado (2016), the McDonald's omega (0.65)

and Cronbach’s alpha (0.64) coefficients are considered, both of which reflect acceptable reliability (Dunn et al., 2014; Nájera Catalán, 2019). Table 5 summarises the primary EFA information. Confirmatory Factor Analysis (CFA), in which items with high factor loadings more accurately represent the latent variable in the model (in this case, self-control) and those that are weakly correlated with others poorly define the variable (Nunkoo et al., 2013), was conducted to validate the factor.

Hence, as scale reliability was confirmed, a new original variable (*SELFC*) that combines the three items was created. Specifically, from the combination of the three items, considering the corresponding weights and weightings, a factor score was obtained for each individual. Low or negative values for the new variable denote low levels of self-control in financial matters, while high or positive values denote high levels of self-control.

Then, two additional variables were created using the self-control score of individuals as a starting point. First, the variable *SELFC_D* is a dummy variable taking the value 1 for those individuals whose estimated self-control score (*SELFC*) is above the median level of self-control and 0 otherwise. Second, the variable *Q#.SELFC* is a categorical variable on the quartiles determined by the individual’s self-control score, with 1 being the lowest level and 4 the highest.

Characteristics of individuals according to their level of self-control in financial matters

Focusing on self-control in financial matters (see Table 6), 52.4% of survey respondents possessed a level of self-control above the median in the sample. Among them, most are women (53.6%) with an average age of 47 years, married (69.6%) and without children under 18 years living at home (65.5%). Concerning individuals’ education, 48% of the sample has completed secondary education – either the first or the second stage – and 25.4% has completed university studies. By contrast, individuals with low levels of self-control (i.e., those below the sample’s median level of self-control) seem to display lower educational attainments. In turn, both subsamples are similar regarding their financial literacy, income level, and employment status.

Regarding borrowing behaviour, although more than half of the respondents have credit cards, few individuals with

a self-control score below the median use their credit cards (3.2%), and even fewer individuals with self-control scores above the median use them (1.6%). Individuals with lower self-control levels seem to prefer using informal credit and asking for money from their family members or friends (10.3%).

The differences are more pronounced when respondents are grouped into the quartiles determined by the individual’s self-control score. Most of the individuals with the lowest level of self-control (Q1) are men (56.5%), whereas most of the individuals with the highest level (Q4) are women (56.6%). In both cases, most individuals are employed or self-employed, even though the employment rate is higher among individuals with the highest level of self-control (56.6% versus 48.1%). Similarly, those individuals with the highest level of self-control (Q4) seem to have attained higher levels of formal education. In this regard, 24% of them have completed university studies (16.6% in the case of individuals with the lowest level of self-control). In contrast, there are no considerable differences in terms of financial literacy.

Concerning indebtedness behaviour, a greater percentage of individuals with the highest level of self-control (Q4) have credit cards (58.9% versus 52.5%). However, when it comes to their use, those with the lowest level of self-control (Q1) use them more (3.9% versus 1.4%). The results evidence that the difference between credit card ownership and credit card use is particularly noticeable. Furthermore, individuals in the lowest quartile of self-control have the highest propensity to borrow from family and friends (12% versus 7.4%).

Econometric model and estimation

In order to analyse whether self-control constitutes a driving force of household borrowing behaviours, nine econometric models were run. Individuals’ debts were modelled as latent variables. Each type of debt was related to self-control measures through the following specification:

$$Y_i^* = \phi(\beta_0 + \beta_1 SELF_i + \beta_j X_i)$$

where *i* denotes the index for the sample individuals, *Y_i^{*}* refers to each type of debt as a latent variable, *SELF* represents the scale of individuals’ self-control (*SELFC*) and, alternatively, the dummy variable (*SELFC_D*) and the self-control quantile variable (*Q#.SELFC*), and *X_i* includes the

Table 5 Factor analysis and reliability of self-control scale

Statement	Cross factor loadings	McDonald’s omega	Cronbach’s alpha
‘I tend to live for today, without thinking about the future’	0.76	0.65	0.64
‘I prefer spending money now to saving it for the future’	0.80		
‘Money is there to be spent’	0.73		

Table 6 Socio-economic and demographic characteristics and borrowing behavior of individuals according to their level of self-control

Variable	Individuals with a level of self-control below the median (SELFC_D=0)			Individuals with a level of self-control above the median (SELFC_D=1)			Individuals with the lowest level of self-control (Q1. SELFC_D=1)			Individuals with the highest level of self-control (Q4. SELFC_D=1)		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Unsecured personal loan	4,068	0.186	0.389	4,474	0.167	0.373	2,162	0.205	0.404	2,000	0.162	0.369
Credit card holding	4,066	0.542	0.498	4,471	0.576	0.494	2,161	0.525	0.499	2,001	0.589	0.492
Family loan	4,049	0.103	0.304	4,452	0.074	0.262	2,15	0.120	0.324	1,993	0.074	0.261
Employer loan	4,049	0.016	0.126	4,452	0.010	0.100	2,15	0.018	0.133	1,993	0.010	0.100
Pawn belongings	4,049	0.009	0.093	4,452	0.005	0.072	2,15	0.010	0.101	1,993	0.006	0.074
Existing credit facility or overdraft	4,049	0.017	0.129	4,452	0.010	0.099	2,15	0.019	0.137	1,993	0.010	0.097
Credit card use	4,049	0.032	0.175	4,452	0.016	0.125	2,15	0.039	0.193	1,993	0.014	0.118
Loan from financial services provider	4,049	0.017	0.130	4,452	0.013	0.111	2,15	0.019	0.135	1,993	0.011	0.105
Loan from informal provider	4,049	0.001	0.035	4,452	0.002	0.042	2,15	0.001	0.030	1,993	0.002	0.039
Gender: female	4,073	0.464	0.499	4,481	0.536	0.499	2,165	0.435	0.496	2,004	0.566	0.496
Age*	4,073	47.50	16.38	4,481	46.97	15.19	2,165	47.85	16.79	2,004	46.11	14.58
Employment status	4,072	0.499	0.500	4,481	0.561	0.472	2,164	0.481	0.500	2,004	0.566	0.496
	4,072	0.145	0.352	4,481	0.133	0.472	2,164	0.143	0.350	2,004	0.142	0.349
	4,072	0.188	0.391	4,481	0.136	0.472	2,164	0.207	0.405	2,004	0.115	0.319
	4,072	0.168	0.374	4,481	0.171	0.472	2,164	0.169	0.375	2,004	0.177	0.381
	3,680	0.376	0.484	4,040	0.347	0.680	1,977	0.404	0.491	1,811	0.361	0.480
	3,680	0.506	0.500	4,040	0.504	0.680	1,977	0.494	0.500	1,811	0.493	0.500
	3,680	0.118	0.323	4,040	0.149	0.680	1,977	0.102	0.303	1,811	0.146	0.354
	4,072	0.028	0.165	4,480	0.020	0.472	2,164	0.035	0.183	2,003	0.018	0.133
	4,072	0.163	0.369	4,480	0.138	0.472	2,164	0.185	0.389	2,003	0.144	0.351
	4,072	0.286	0.452	4,480	0.259	0.472	2,164	0.298	0.457	2,003	0.258	0.438
	4,072	0.236	0.424	4,480	0.221	0.472	2,164	0.226	0.418	2,003	0.230	0.421
	4,072	0.097	0.296	4,480	0.109	0.472	2,164	0.090	0.286	2,003	0.110	0.313
	4,072	0.190	0.393	4,480	0.254	0.472	2,164	0.166	0.372	2,003	0.240	0.427
	4,071	0.266	0.442	4,480	0.345	0.475	2,164	0.246	0.431	2,004	0.373	0.484
	4,071	0.613	0.487	4,480	0.696	0.460	2,164	0.587	0.493	2,004	0.708	0.455
	3,933	0.135	0.342	4,370	0.130	0.933	2,084	0.136	0.343	1,968	0.137	0.344
	3,933	0.352	0.477	4,370	0.320	0.933	2,084	0.366	0.482	1,968	0.331	0.470
	3,933	0.333	0.471	4,370	0.352	0.933	2,084	0.323	0.468	1,968	0.346	0.476
	3,933	0.179	0.383	4,370	0.197	0.933	2,084	0.174	0.379	1,968	0.186	0.389

In the case of the dummy and categorical variables, the value of the mean reports the percentage of people who fulfil the condition according to which those variables take the value equal to 1. Age variable is not expressed as a logarithm. *Obs.* and *Std. Dev.* stand for the number of observations and standard deviation, respectively

set of control variables. Debt measures have a dichotomous nature; therefore, the econometric models were estimated using *probit* regressions. This methodology considers a non-linear relationship between the explained variable and the set of explanatory variables selected for the empirical study based on the following expression:

$$Pr(y = 1|x) = Pr(\varepsilon > -\{\alpha + \beta x\}|x) \quad (1)$$

The probability that an individual belongs to a group depends on the distribution of ε that, in the case of *probit* models, is assumed to follow a standard normal distribution with variance equal to the unit [$\text{Var}(\varepsilon) = 1$], so that:

$$P(y = 1|x) = \int_{-\infty}^z \frac{1}{\sqrt{2\pi}} e^{\left(\frac{-s^2}{2}\right)} ds \quad (2)$$

After running a baseline econometric model with all the control variables, the variable on individuals' self-control (*SELFC*) was added. Additional models using the *SELFC_D* and *Q#.SELFC* variables were also run. Given that these alternative measures of individuals' self-control did not significantly change the findings, only the estimates using the *SELFC* variable are displayed in Table 7. The main findings obtained with the *SELFC_D* and *Q#.SELFC* variables are graphically illustrated in Fig. 2.

Regarding the type of debt incurred by households, the estimates in Table 7 suggest that low levels of self-control positively increase the probability of holding unsecured personal loans. In contrast, no statistically significant effect is found regarding credit card possession. The relationships between self-control and those debts that refer to taking out a loan from an informal moneylender and pawning belongings also fail to be statistically significant. However, when the dependent variables refer to individuals' (rather than households') debts, empirical evidence clearly confirms the first proposed hypothesis (i.e. the lack of self-control is positively associated with indebtedness) for five out of the seven types of household debt considered. These results are consistent with the findings of Webley and Nyhus (2001), Wang et al. (2011), Gathergood (2012), Gathergood and Weber (2014), and Achziger et al. (2015). In short, the estimates suggest that the constructed measure of self-control in financial matters (*SELFC*) yields consistent evidence across different models.

Unlike previous studies on the relationship between self-control and borrowing behaviour, this paper analyses whether the effect of self-control differs across different types of (individual and household) debt. Moreover, in this regard, evidence in Table 7 points to a more significant effect of self-control upon holding unsecured bank loans, loans from family and friends, and credit card usage, compared to the remaining types of debt. These conclusions remain when individuals' self-control is alternatively measured by

using the additional variables on self-control (i.e. *SELFC_D* and *Q#.SELFC* variables). Thus, Fig. 2 depicts the estimated average marginal effects of *SELFC_D* and *Q#.SELFC* variables for each type of debt. The results not only support those in Table 7, but also confirm two additional findings.

First, individuals in the lowest quartile of self-control (Q1) have the highest probability of holding debts compared to those in the highest quartile (Q4). However, except for loans from family and friends and credit card use, no significant differences were found between individuals in the Q2 and Q3 quartiles compared to those in the highest quartile. These results suggest that the effect of self-control on borrowing behaviour is stronger for those individuals displaying the lowest or highest levels of self-control.

Second, whereas credit card use seems to be positively associated with a lack of self-control, holding a credit card seems to demonstrate the opposite relationship. As mentioned, having a credit card does not necessarily imply using it. In this regard, given that bank credit card holders need to undertake a risk assessment process, the estimates might reflect that this process filters the individuals to some extent, thus attending to their self-control.

The explanation for the different effect of self-control, depending on the type of debt analysed, may come from the supply side of credit rather than the demand side. Thus, individuals with a low level of self-control may be tempted to get into debt when they cannot make ends meet. However, this first impulse faces some barriers from the supply perspective. This is what seems to happen for four out of the five types of debt offered by financial providers, namely unsecured personal loans, existing credit facilities or overdrafts, credit cards, and new credit lines. More specifically, when the analysis focuses on the loans held by individuals to make ends meet, existing credit card debt is the type of debt most affected by self-control problems, whereas new credit lines are the least affected. This may occur because the individual, in the case of existing credit cards, does not usually need to have an appointment with the banking staff to use it, as consumer credit is characterised by being readily available (Gathergood, 2012). However, in the case of the existing credit facility, a previous meeting with the banking staff might be required, i.e. a meeting that may be compulsory in the case of applying for a new loan. Moreover, in the latter case, the applicants are subject to a thorough scrutiny of their capacity to repay the obligations during the underwriting process, which may restrain their first impulse to apply for a new loan.

Something similar occurs with loan applications among people belonging to the individual's current networks. Thus, while family and friends tend to be more accessible, loans borrowed from employers often require a formal application procedure. In addition, individuals tend to be reluctant to reveal information about their financial situation, even

Table 7 *Probit* estimates (marginal effects)

	Debts held by the individual						Debts held by the household		
	Family loan	Employer loan	Pawn belongings	Existing credit facility or overdraft	Credit card use	Loan from financial services provider	Loan from informal provider	Unsecured personal loan	Credit card holding
Gender	0.009 (0.007)	0.005* (0.003)	0.004 (0.002)	0.001 (0.003)	0.002 (0.004)	0 (0.003)	-0.002 (0.001)	-0.012 (0.009)	-0.009 (0.011)
Age	0.748** (0.231)	0.049 (0.088)	0.075 (0.083)	-0.051 (0.096)	0.236 (0.150)	0.261 (0.142)	-0.062 (0.036)	3.330*** (0.380)	1.274** (0.389)
Age²	-0.108*** (0.032)	-0.01 (0.012)	-0.012 (0.012)	0.008 (0.013)	-0.032 (0.021)	-0.035 (0.019)	0.008 (0.005)	-0.451*** (0.052)	-0.154** (0.054)
Employment status [Ref. 1]	2 0.052*** (0.011)	-0.010*** (0.003)	-0.001 (0.003)	-0.003 (0.004)	-0.014*** (0.004)	-0.004 (0.004)	0 (.)	-0.066*** (0.012)	-0.095*** (0.017)
	3 -0.019 (0.014)	-0.012*** (0.003)	-0.003 (0.005)	-0.012*** (0.003)	-0.011 (0.006)	-0.001 (0.007)	-0.002 (0.002)	-0.015 (0.019)	-0.052* (0.022)
	4 0.022* (0.011)	-0.009** (0.003)	0 (0.003)	-0.003 (0.004)	-0.001 (0.006)	-0.002 (0.005)	-0.003* (0.001)	-0.079*** (0.013)	-0.086*** (0.018)
Income level [Ref. 1]	2 -0.099*** (0.008)	-0.017*** (0.003)	-0.007* (0.003)	-0.004 (0.003)	-0.003 (0.004)	-0.004 (0.004)	-0.002 (0.001)	0.024* (0.011)	0.147*** (0.012)
	3 -0.098*** (0.005)	-0.016*** (0.002)	0 (.)	-0.009* (0.004)	-0.015** (0.005)	-0.006 (0.004)	-0.001 (0.002)	0.059** (0.018)	0.258*** (0.016)
Educational attainment [Ref. 1]	2 -0.011 (0.019)	-0.007 (0.007)	0.003 (0.010)	0 (0.010)	-0.01 (0.010)	0.004 (0.007)	0.001 (0.003)	0.024 (0.042)	0.130*** (0.037)
	3 -0.014 (0.020)	-0.004 (0.009)	0.001 (0.009)	-0.002 (0.010)	-0.003 (0.013)	0.005 (0.005)	0.002 (0.003)	0.049 (0.042)	0.239*** (0.030)
	4 -0.032 (0.019)	-0.002 (0.009)	-0.003 (0.008)	0.003 (0.012)	0 (0.014)	0.009 (0.006)	0.001 (0.002)	0.050 (0.043)	0.303*** (0.028)
	5 -0.045** (0.016)	-0.009 (0.006)	-0.005 (0.006)	-0.003 (0.009)	-0.007 (0.012)	0.005 (0.007)	0 (.)	0.028 (0.044)	0.308*** (0.028)
	6 -0.052** (0.016)	-0.012* (0.006)	-0.008 (0.004)	-0.001 (0.010)	-0.012 (0.011)	0 (.)	0 (.)	0.021 (0.039)	0.367*** (0.030)
Dependent children	0.016 (0.009)	0.004 (0.003)	-0.001 (0.003)	0.005 (0.004)	0.004 (0.005)	-0.001 (0.004)	0.001 (0.002)	0.009 (0.011)	0.021 (0.014)
Marital status: married	-0.01 (0.008)	0.003 (0.003)	-0.006 (0.003)	0.001 (0.003)	0.002 (0.004)	0 (0.003)	0.001 (0.002)	0.043*** (0.011)	0.045** (0.013)

Table 7 (continued)

	Debts held by the individual										Debts held by the household		
	Family loan		Employer loan	Pawn belongings	Existing credit facility or overdraft	Credit card use	Loan from financial services provider	Loan from informal provider	Unsecured personal loan	Credit card holding			
Financial literacy [Ref. 0]	1	-0.003 (0.009)	0.012* (0.005)	-0.002 (0.003)	-0.002 (0.004)	0.001 (0.006)	-0.004 (0.004)	-0.001 (0.001)	-0.017 (0.014)	0.015 (0.017)			
	2	-0.008 (0.010)	0.008 (0.006)	-0.003 (0.003)	0.003 (0.005)	0.003 (0.006)	-0.002 (0.004)	-0.002 (0.001)	-0.015 (0.014)	0.026 (0.017)			
	3	-0.012 (0.011)	0.009 (0.008)	0 (0.004)	0.005 (0.006)	0.005 (0.008)	-0.001 (0.005)	-0.001 (0.002)	-0.018 (0.016)	0.041* (0.020)			
Self-control		-0.016*** (0.003)	-0.004** (0.001)	-0.002 (0.001)	-0.005*** (0.001)	-0.011*** (0.002)	-0.004* (0.001)	0.001 (0.000)	-0.024*** (0.004)	0.000 (0.005)			
N		7439	7439	6409	7439	7439	7305	5612	7463	7462			
Wald χ^2 (d.f.)		545.98*** (19)	135.35*** (19)	71.18*** (18)	30.94* (19)	74.52*** (19)	21.76*** (18)	387.04*** (16)	392.01*** (19)	1204.45*** (19)			
Pseudolikelihood		-1959.87	-457.51	-288.68	-537.9	-837.41	-579.86	-77.69	-3327.81	-4403.05			
Hosmer-Lemeshow χ^2 (8 d.f.)		2.84	14.44	11.78	20.47**	8.04	6.4	6.95	6.49	21.62**			
R ² McFadden		0.1445	0.1441	0.1012	0.0323	0.0452	0.0197	0.094	0.063	0.1363			

Table 7 shows the *probit* estimates of holding the different type of debts. Namely, the marginal effect of each estimate is identified. Age² variable was included to capture potential non-linearities. The levels of significance are given by * $p < 0.05\%$, ** $p < 0.01\%$, and *** $p < 0.001\%$. Robust standard errors are enclosed in parentheses. *d.f.* stands for the degrees of freedom

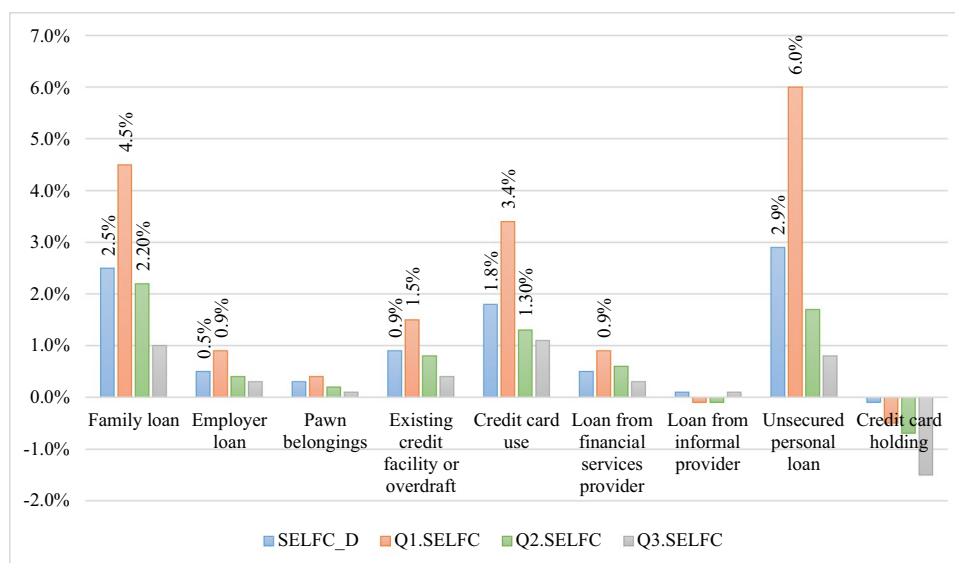


Fig. 2 Estimated marginal effects of *SELFC_D* and *Q#.SELFC* variables on holding debts, by type of debt.

Notes: Fig. 2 shows the estimated marginal effects of the *SELFC_D* and *Q#.SELFC* [Ref. Q4] variables on holding different types of debt. Numerical information is only displayed for the significant effects.

those belonging to their closest social network (Altundere, 2014; Georgarakos et al., 2014). Hence, borrowing from their employers is an action that individuals will probably avoid at all costs.

The potential effect of the supply side of credit is even clearer when dealing with credit cards. Thus, whereas credit card use is positively related to low levels of self-control, credit card holding seems to have the opposite relationship with self-control. Therefore, the estimated marginal effects suggest that banks and credit institutions provide credit cards to those individuals with less severe self-control problems.

The contrasting effect of self-control on different types of consumer debt also has important consequences for the individual from a psychological perspective. Plagnol (2011) noted that some types of debt could be considered better than others. More specifically, credit card debt is positively related to anxiety (Drenea, 2000) and reduced psychological well-being (Brown et al., 2005). Similarly, unsecured debt's burdensome interest and repayment structures make it especially stressful (Zurlo et al., 2014). Although in Spain most credit cards are used to defer payments, the number of revolving credits using extant credit cards is increasing. In fact, the Bank of Spain has begun to warn on its website that this type of credit can generate a perpetual debt in which only interest is paid.

Finally, regarding the control variables, financial literacy and family size do not seem to affect individuals' borrowing behaviour. In the case of marital status, even though its relationship with the different types of

SELFC_D denotes a dummy variable taking a value of 1 for those individuals whose estimated self-control score is above the median level of self-control and a value of 0 otherwise. *Q#.SELFC* denotes the categorical variable on the quartiles determined by the individual's self-control score, with 1 being the lowest level and 4 the highest

individual debts is not statistically significant, it is statistically significant when it comes to household debts. Thus, those who live with their partners are more likely to have unsecured personal loans and credit cards. It seems that family offers financial protection in the event of unforeseen circumstances, which might lead individuals to take on more debt. The remaining driving forces display different effects depending on the type of debt considered. Thus, income is negatively associated with holding debts to make ends meet, whereas it is positively related to holding unsecured bank loans and credit cards (household debts). This result might be because banks use the income to screen borrowers, as in traditional models of financial contracting under adverse selection (Loschiavo, 2016). Age reveals an inverted U-shaped relationship with loans from family and friends, new credit from financial providers, unsecured bank loans, and credit cards. Employment status clearly affects employer loans and unsecured bank loans and credit; thus, being unemployed decreases the probability of holding and using those types of debt. Conversely, it increases the probability of borrowing from family and friends. According to empirical evidence, women are more likely than men to borrow from their employer (i.e. more likely to apply for a salary advance). The level of education seems to influence informal loans and credit card holding. In this regard, the greater the educational attainment, the lower the probability of borrowing from relatives, while an opposite pattern is found in the case of credit card holding.

Discussion

Individual finances are a relevant issue for families and society at large. Much is known about the indebtedness of households in developed countries and about the types of debt they hold; however, little is known about the potential effects of specific behavioural and attitudinal aspects on indebtedness (Rahman et al., 2020). Indeed, few studies have addressed the relationship between attitudinal factors, such as self-control and debt (Achtziger et al., 2015; Gathergood, 2012; Gathergood & Weber, 2014; Wang et al., 2011; Webley & Nyhus, 2001; Wilcox et al., 2011), and the studies that have addressed it have certain limitations. This paper overcomes some of these limitations. Notably, this paper addresses distinct types of debt rather than a single or aggregate measure, as previous literature has done. Several authors stress the importance of studying the different types of debt. Particularly, Prelec and Simester (2001) highlighted the differences between borrowing behaviours, stating that credit card debt is identified as psychologically different from other forms of debt. Similarly, Greenberg and Hershfield (2019) state that swiping a credit card is psychologically different from taking out a less expensive loan. Moreover, this paper proposes a financial-oriented self-control scale, which leads to a better understanding of how borrowing constraints may condition the relationship between self-control and debt holding.

More specifically, this paper contributes to the empirical literature on consumer finance by demonstrating that individuals' behavioural characteristics significantly impact their borrowing decisions. More in detail, this paper examines the relationship of financial self-control with up to nine types of debt in a sample of 8,554 Spanish individuals, also providing insight into the driving forces of borrowing decisions. The behavioural life-cycle (BLC) hypothesis states that self-control positively affects saving behaviour, and our evidence is in line with this hypothesis. The empirical evidence is also consistent with the conclusions drawn in the meta-analytic review by Frigerio et al. (2020) on the relationship between impulsivity and over-indebtedness. Therefore, it seems that individuals suffering from self-control problems are not only more likely to get into debt, as this paper suggests, but also more likely to become over-indebted, which constitutes a greater problem, because, as Leandro and Botelho (2022) acknowledge, the consequences of over-indebtedness for consumers can be quite worrying.

Nonetheless, this study goes beyond the extant literature. Firstly, evidence suggests that the first impulses of individuals lead them to ask their relatives (i.e. family members or friends) for a loan. However, the effect of

the lack of self-control decreases when it comes to debts that require a relationship with unfamiliar or official lenders. A 'pecking order' of borrower preferences seems to arise in the latter. Thus, individuals with low levels of self-control would primarily use an existing credit card, then an already existing credit facility or an authorised overdraft and, lastly, a new credit line. The scrutiny and risk assessment of the potential borrowers during the underwriting process can 'discipline' the individuals' first impulses to apply for a new loan. Secondly, empirical evidence also suggests that self-control problems do not significantly affect credit card holding. Therefore, the granting of credit cards by the banking sector may already act as the first filter against individuals with self-control problems. These findings are also essential insofar as the type of debt acquired by individuals affects, according to Bialowolski and Weziak-Bialowolska (2021), significant personal and social issues. In this regard, these authors found that the different forms of household debt may influence life satisfaction. Specifically, their evidence suggests that credit card debt and student loans negatively affect life satisfaction in the short term, whereas mortgages seem to increase life satisfaction.

Based on previous results, several implications for practice and policy can be derived from this study. Firstly, as Trzcńska et al. (2021) demonstrate, it is possible to induce a self-control approach in individuals (children, as these authors specifically study) to modify their behaviour. So, teaching self-control is possible (Achtziger et al., 2015). In this regard, financial education programs should familiarise individuals with planning strategies to reach long-term financial goals. Rather than just explaining core financial concepts, more applied training becomes necessary. Besides, financial educators ought to teach the benefits and risks of different consumer credits. As mentioned, the Bank of Spain has recently started to warn individuals of the danger of using revolving credit through credit cards. However, more effort is required regarding this issue. Likewise, the decision-making process will influence individuals' capacity to have more or less self-control (Chen et al., 2022). Therefore, training in decision-making strategies becomes crucial. Moreover, as also acknowledged by Davydenko et al. (2021) in their meta-analysis on financial self-control strategies, self-control can be enhanced by using these strategies rather than solely relying on the willpower to overcome temptations.

Additionally, since the findings suggest that the supply side of the credit market might act, to some extent, as a firewall against individuals with self-control problems, policymakers may ask banks to insist on this preliminary assessment of potential self-control problems to prevent unhealthy borrowing behaviours. As Gathergood (2012)

remarks, consumers who suffer from self-control problems are more likely to get over-indebted, as they make more use of high-cost credit (namely, high-cost credit accessible at short notice and/or at the point of sale) and to be more exposed to financial distress. Questionnaires to customers and even interviews with relatives could be another way to detect this time inconsistency problem early. In fact, individuals' outstanding debt can also put their relatives at risk of insolvency. Besides, consumers require adequate financial empowerment to make appropriate financial decisions (Nam, 2022). To this end, as Mawad et al. (2022) suggest, policies should help young adults acquire skills in self-control as well as integrating financial knowledge into school curricula. In this regard, as Boto-García et al. (2022) also advocate, financial socialization, understood as the exposure to financial concepts while growing up, becomes essential.

Limitations and future research directions

Despite its contributions, this study presents some limitations. Firstly, the dataset has a cross-sectional nature, obstructing longitudinal analysis and the possibility of drawing causal relationships. This limitation may be overcome when new editions of the survey are published. Secondly, the use of secondary data has limitations, such as time lags (up to six years in our case). However, no other survey would allow us to analyse this topic with more up-to-date data. Thirdly, future studies should broaden the portfolio of possibilities concerning household debt. In this regard, it is vital to bear in mind that some of the credit options here are 'necessary' (not voluntarily chosen) loans to make ends meet and cover living expenses. Therefore, this type of debt is not the most appropriate to explore the potential effect of self-control. In such cases, self-control might fail as a driving force, as identified for some credit options like pawning belongings or asking for a loan from an informal provider. And fourthly, the use of self-reported measures of self-control could constitute a pitfall, due to their higher susceptibility of psychological distortions, as already suggested by Jia et al. (2022). In this regard, future studies should complement self-reported measures with behavioural measures (Dang et al., 2020). Combining these measures to assess self-control has already been done in contexts other than the financial one (e.g., Boon-Falleur et al., 2022).

This paper opens the way for further research. In this regard, future studies might benefit from considering continuous variables on debt. Even though the *Survey of Financial Competences* is quite comprehensive, it does not provide any information on the amount of debt its respondents hold. This study can also be extended by addressing other issues that contribute to self-control (e.g., locus of control, time preferences...). The consideration of additional variables and new econometric models (e.g., structural equation

modelling) would also allow us to assess whether other theoretical approaches (e.g. the theory of planned behaviour, as suggested by Nunkoo and Ramkissoon (2010)), could contribute to explaining the importance of self-control when making borrowing decisions. In sum, as Mansfield et al. (2003) acknowledge, self-control is just one of the pieces of the complex puzzle of consumer borrowing patterns, so more research on this topic is still needed.

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Declarations

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Conflict of interest The authors declare that they have no conflict of interest.

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References

- Achtziger, A., Huber, M., Kenning, P., Raab, G., & Reisch, L. (2015). Debt out of control: The links between self-control, compulsive buying, and real debts. *Journal of Economic Psychology*, 49, 141–149. <https://doi.org/10.1016/j.joep.2015.04.003>
- Agarwal, S., Chomsisengphet, S., & Liu, C. (2010). The importance of adverse selection in the credit card market: Evidence from randomised trials of credit card solicitations. *Journal of Money, Credit and Banking*, 42(4), 743–754. <https://doi.org/10.1111/j.1538-4616.2010.00305.x>
- Altundere, M. B. (2014). The relationship between sociability and household debt. *Adam Akademi*, 2(4), 27–58. <https://doi.org/10.31679/adamakademi.167-248>
- Ameriks, J., Caplin, A., Leahy, J., & Tyler, T. (2007). Measuring self-control problems. *American Economic Review*, 97(3), 966–972. <https://doi.org/10.1257/aer.97.3.966>

- Angel, S., & Heitzmann, K. (2015). Over-indebtedness in Europe: The relevance of country-level variables for the over-indebtedness of private households. *Journal of European Social Policy*, 25(3), 331–351. <https://doi.org/10.1177/0958928715588711>
- Atkinson, A., & Messy, F. A. (2011). Assessing financial literacy in 12 countries: An OECD/INFE international pilot exercise. *Journal of Pension Economics & Finance*, 10(4), 657–665. <https://doi.org/10.1017/s1474747211000539>
- Banco de España, & CNMV -Comisión Nacional del Mercado de Valores. (2018). Survey of Financial Competences (ECF) 2016 (dataset). <https://app.bde.es/pmk/en/ecf/2016>. Accessed 22 Jan 2021.
- Banco de España. (2019). Payment Statistics – Regulation (EU) 1409/2013. https://www.bde.es/bde/es/areas/estadis/estadisticas-por/operaciones-y-si/relacionados/Principales_est_1733fa95514921.html. Accessed 22 Jan 2020.
- Banco de España. (2022). Payment Statistics – Bank payment cards. Statistics. https://www.bde.es/bde/en/areas/sispage/Sistemas_de_pago/Tarjetas_bancari/Tarjetas_de_pago.html. Accessed 21 Nov 2022.
- Bialowolski, P., & Weziak-Bialowolska, D. (2021). Good credit, bad credit: The differential role of the sources of debt in life satisfaction. *Journal of Consumer Affairs*, 55(3), 967–994. <https://doi.org/10.1111/joca.12388>
- Boon-Falleur, M., Bouguen, A., Charpentier, A., Algan, Y., Huillery, É., & Chevallier, C. (2022). Simple questionnaires outperform behavioral tasks to measure socio-emotional skills in students. *Scientific Reports*, 12(1), 1–11. <https://doi.org/10.1038/s41598-021-04046-5>
- Boto-García, D., Buccioli, A., & Manfrè, M. (2022). The role of financial socialization and self-control on saving habits. *Journal of Behavioral and Experimental Economics*, 101903. <https://doi.org/10.1016/j.soceec.2022.101903>
- Brown, S., Taylor, K., & Price, S. W. (2005). Debt and distress: Evaluating the psychological cost of credit. *Journal of Economic Psychology*, 26(5), 642–663. <https://doi.org/10.1016/j.joep.2005.01.002>
- Bu, D., Hanspal, T., Liao, Y., & Liu, Y. (2022). Cultivating self-control in FinTech: Evidence from a field experiment on online consumer borrowing. *Journal of Financial and Quantitative Analysis*, 57(6), 2208–2250. <https://doi.org/10.1017/S0022109021000314>
- Chen, C., Lin, W., & He, G. (2022). The effect of decision strategy on self-control choice. *Current Psychology*, 1–13. <https://doi.org/10.1007/s12144-022-03961-8>
- Collard, S., Finney, A., Hayes, D., & Davies, S. (2012). *Quids In: The Impact of Financial Skills Training for Social Housing Tenants*. Citizens Advice.
- Dang, J., King, K. M., & Inzlicht, M. (2020). Why are self-report and behavioral measures weakly correlated? *Trends in Cognitive Sciences*, 24(4), 267–269. <https://doi.org/10.1016/j.tics.2020.01.007>
- Davydenko, M., Kolbuszewska, M., & Peetz, J. (2021). A meta-analysis of financial self-control strategies: Comparing empirical findings with online media and lay person perspectives on what helps individuals curb spending and start saving. *PLoS ONE*, 16(7), e0253938. <https://doi.org/10.1371/journal.pone.0253938>
- Disney, R., & Gathergood, J. (2013). Financial literacy and consumer credit portfolios. *Journal of Banking & Finance*, 37(7), 2246–2254. <https://doi.org/10.1016/j.jbankfin.2013.01.013>
- Drentea, P. (2000). Age, debt and anxiety. *Journal of Health and Social Behavior*, 41(4), 437–450. <https://doi.org/10.2307/2676296>
- Dunn, T. J., Baguley, T., & Brunnsden, V. (2014). From alpha to omega: A practical solution to the pervasive problem of internal consistency estimation. *British Journal of Psychology*, 105(3), 399–412. <https://doi.org/10.1111/bjop.12046>
- Faria, J. R., Wang, L., & Wu, Z. (2012). Debts on debts. *The North American Journal of Economics and Finance*, 23(2), 203–219. <https://doi.org/10.1016/j.najef.2012.02.003>
- Farrell, L., Fry, T. R. L., & Risse, L. (2016). The significance of financial self-efficacy in explaining women's personal finance behavior. *Journal of Economic Psychology*, 54, 85–99. <https://doi.org/10.1016/j.joep.2015.07.001>
- French, D., & McKillop, D. (2016). Financial literacy and over-indebtedness in low-income households. *International Review of Financial Analysis*, 48, 1–11. <https://doi.org/10.1016/j.irfa.2016.08.004>
- Frigerio, M., Ottaviani, C., & Vandone, D. (2020). A meta-analytic investigation of consumer over-indebtedness: The role of impulsivity. *International Journal of Consumer Studies*, 44(4), 328–342. <https://doi.org/10.1111/ijcs.12570>
- Gathergood, J. (2012). Self-control, financial literacy and consumer over-indebtedness. *Journal of Economic Psychology*, 33(3), 590–602. <https://doi.org/10.1016/j.joep.2011.11.006>
- Gathergood, J., & Weber, J. (2014). Self-control, financial literacy & the Co-holding puzzle. *Journal of Economic Behavior & Organization*, 107(Part B), 455–469. <https://doi.org/10.2139/ssrn.2005031>
- Georgarakos, D., Haliassos, M., & Pasini, G. (2014). Household debt and social interactions. *The Review of Financial Studies*, 27(5), 1404–1433. <https://doi.org/10.2139/ssrn.2181948>
- Gerhard, P., Gladstone, J. J., & Hoffmann, A. O. I. (2018). Psychological characteristics and household savings behavior: The importance of accounting for latent heterogeneity. *Journal of Economic Behavior and Organization*, 148, 66–82. <https://doi.org/10.1016/j.jebo.2018.02.013>
- Greenberg, A. E., & Hershfield, H. E. (2019). On shifting consumers from high-interest to low-interest debt. *Financial Planning Review*, 2(1), e1035. <https://doi.org/10.1002/cfp2.1035>
- Hira, T., Rock, W. L., & Loibl, C. (2009). Determinants of retirement planning behavior and differences by age. *International Journal of Consumer Studies*, 33(3), 293–301. <https://doi.org/10.1111/j.1470-6431.2009.00742.x>
- Jia, L., Yuen, W. L., Ong, Q., & Theseira, W. E. (2022). Pitfalls of self-reported measures of self-control: Surprising insights from extreme debtors. *Journal of Personality*. <https://doi.org/10.1111/jopy.12733>
- Kimball, M. S., & Shumway, T. (2009). *Fatalism, locus of control and retirement saving*. University of Michigan.
- König, N., & Gröbl, I. (2014). Catching up With the Joneses and Borrowing Constraints: An Agent-based Analysis of Household Debt. DEP (Socioeconomics) Discussion Papers, Macroeconomics and Finance Series, No. 4/2014.
- Kukk, M. (2019). Debt repayment problems: Short-term and long-term implications for spending. *Review of Economics of the Household*, 17, 715–740. <https://doi.org/10.1007/s11150-018-9424-2>
- Leandro, J. C., & Botelho, D. (2022). Consumer over-indebtedness: A review and future research agenda. *Journal of Business Research*, 145, 535–551. <https://doi.org/10.1016/j.jbusres.2022.03.023>
- Lindner, C., Nagy, G., & Retelsdorf, J. (2015). The dimensionality of the Brief Self-Control Scale—An evaluation of unidimensional and multidimensional applications. *Personality and Individual Differences*, 86, 465–473. <https://doi.org/10.1016/j.paid.2015.07.006>
- Liu, F., Yilmazer, T., Loibl, C., & Montalto, C. (2019). Professional financial advice, self-control and saving behavior. *International Journal of Consumer Studies*, 43(1), 23–34. <https://doi.org/10.1111/ijcs.12480>
- Loibl, C., Letkiewicz, J., McNair, S., Summers, B., & Bruine de Bruin, W. (2021). On the association of debt attitudes with socioeconomic characteristics and financial behaviors. *Journal of Consumer Affairs*, 55(3), 939–966. <https://doi.org/10.1111/joca.12384>

- Loschiavo, D. (2016). Household debt and income inequality: Evidence from Italian Survey Data. Bank of Italy Temi di Discussione (Working Paper), No. 1095.
- Lown, J. M. (2011). Development and validation of a financial self-efficacy scale. *Journal of Financial Counseling and Planning*, 22(2), 54–64.
- Lusardi, A., & Mitchell, O. S. (2011a). Financial literacy and planning: Implications for retirement well-being. In A. Lusardi & O. S. Mitchell (Eds.), *Financial literacy. Implications for retirement security and the financial marketplace* (pp. 17–39). Oxford University Press.
- Lusardi, A., & Mitchell, O. S. (2011b). Financial literacy around the world: An overview. *Journal of Pension Economics & Finance*, 10(4), 497–508. <https://doi.org/10.1017/S1474747211000448>
- Lusardi, A., & Tufano, P. (2009). Debt literacy, financial experience and overindebtedness. *Journal of Pension Economics & Finance*, 14(4), 332–368. <https://doi.org/10.1017/S1474747215000232>
- Mansfield, P. M., Pinto, M. B., & Parente, D. H. (2003). Self-control and credit-card use among college students. *Psychological Reports*, 92(3), 1067–1078. <https://doi.org/10.2466/pr0.2003.92.3c.1067>
- Mawad, J. L., Athari, S. A., Khalife, D., & Mawad, N. (2022). Examining the impact of financial literacy, financial self-control, and demographic determinants on individual financial performance and behavior: An insight from the Lebanese crisis period. *Sustainability*, 14(22), 15129. <https://doi.org/10.3390/su142215129>
- Meier, S., & Sprenger, C. (2010). Present-biased preferences and credit card borrowing. *American Economic Journal: Applied Economics*, 2(1), 193–210. <https://doi.org/10.1257/app.2.1.193>
- Mpaata, E., Koske, N., & Saina, E. (2021). Does self-control moderate financial literacy and savings behavior relationship? A case of micro and small enterprise owners. *Current Psychology*, 1–14. <https://doi.org/10.1007/s12144-021-02176-7>
- Nájera Catalán, H. E. (2019). Reliability, population classification and weighting in multidimensional poverty measurement: A Monte Carlo study. *Social Indicators Research*, 142(3), 887–910. <https://doi.org/10.1007/s11205-018-1950-z>
- Nam, S. J. (2022). Effects of financial empowerment and self-confidence in financial empowerment on financial well-being. *Current Psychology*, 1–11. <https://doi.org/10.1007/s12144-022-03916-z>
- Nilsen, F. A., Bang, H., Boe, O., Martinsen, Ø. L., Lang-Ree, O. C., & Røysamb, E. (2020). The Multidimensional Self-Control Scale (MSCS): Development and validation. *Psychological Assessment*, 32(11), 1057–1074. <https://doi.org/10.1037/pas0000950>
- Nunkoo, R., & Ramkissoon, H. (2010). Gendered theory of planned behaviour and residents' support for tourism. *Current Issues in Tourism*, 13(6), 525–540. <https://doi.org/10.1080/13683500903173967>
- Nunkoo, R., Ramkissoon, H., & Gursoy, D. (2013). Use of structural equation modeling in tourism research: Past, present, and future. *Journal of Travel Research*, 52(6), 759–771. <https://doi.org/10.1177/0047287513478503>
- OECD. (2019). Household accounts-Household debt-OECD Data. <https://data.oecd.org/hha/household-debt.htm>. Accessed 1 Feb 2020.
- Plagnol, A. C. (2011). Financial satisfaction over the life course: The influence of assets and liabilities. *Journal of Economic Psychology*, 32(1), 45–64. <https://doi.org/10.1016/j.joep.2010.10.006>
- Prelec, D., & Simester, D. (2001). Always leave home without it: A further investigation of the credit-card effect on willingness to pay. *Marketing Letters*, 12, 5–12. <https://doi.org/10.1023/A:1008196717017>
- Rahman, M., Azma, N., Masud, M. A. K., & Ismail, Y. (2020). Determinants of indebtedness: Influence of behavioral and demographic factors. *International Journal of Financial Studies*, 8(1), 1–14. <https://doi.org/10.3390/ijfs8010008>
- Servon, L. J., & Kaestner, R. (2008). Consumer financial literacy and the impact of online banking on the financial behavior of lower-income bank customers. *Journal of Consumer Affairs*, 42(2), 271–305. <https://doi.org/10.1111/j.1745-6606.2008.00108.x>
- Sevim, N., Temizel, F., & Sayılır, Ö. (2012). The effects of financial literacy on the borrowing behavior of Turkish financial consumers. *International Journal of Consumer Studies*, 36(5), 573–579. <https://doi.org/10.1111/j.1470-6431.2012.01123.x>
- Shefrin, H. M., & Thaler, R. H. (1988). The behavioral life-cycle hypothesis. *Economic Enquiry*, 26(4), 609–643. <https://doi.org/10.1111/j.1465-7295.1988.tb01520.x>
- Strömbäck, C., Lind, T., Skagerlund, K., Västfjäll, D., & Tinghög, G. (2017). Does self-control predict financial behavior and financial well-being? *Journal of Behavioral and Experimental Finance*, 14, 30–38. <https://doi.org/10.1016/j.jbef.2017.04.002>
- Thaler, R. H., & Benartzi, S. (2004). Save more tomorrow™: Using behavioral economics to increase employee saving. *Journal of Political Economy*, 112(S1), 164–187. <https://doi.org/10.1086/380085>
- Trizano-Hermosilla, I., & Alvarado, J. M. (2016). Best alternatives to Cronbach's Alpha reliability in realistic conditions: Congeneric and asymmetrical measurements. *Frontiers in Psychology*, 7, 769. <https://doi.org/10.3389/fpsyg.2016.00769>
- Trzcińska, A., Sekścińska, K., & Maison, D. (2021). The role of self-control and regulatory foci in money-saving behaviours among children. *Current Psychology*, 40(1), 344–354. <https://doi.org/10.1007/s12144-018-9944-1>
- Wang, L., Lu, W., & Malhotra, N. K. (2011). Demographics, attitude, personality and credit card features correlate with credit card debt: A view from China. *Journal of Economic Psychology*, 32(1), 179–193. <https://doi.org/10.1016/j.joep.2010.11.006>
- Webley, P., & Nyhus, E. K. (2001). Life-cycle and dispositional routes into problem debt. *British Journal of Psychology*, 92(3), 423–446. <https://doi.org/10.1348/000712601162275>
- Wilcox, K., Block, L. G., & Eisenstein, E. M. (2011). Leave home without it? The effects of credit card debt and available credit on spending. *Journal of Marketing Research*, 48, 78–90. <https://doi.org/10.1509/jmkr.48.SPL.S78>
- Zhao, J., Meng, G., Sun, Y., Xu, Y., Geng, J., & Han, L. (2021). The relationship between self-control and procrastination based on the self-regulation theory perspective: The moderated mediation model. *Current Psychology*, 40(10), 5076–5086. <https://doi.org/10.1007/s12144-019-00442-3>
- Zurlo, K. A., Yoon, W., & Kim, H. (2014). Unsecured consumer debt and mental health outcomes in middle-aged and older Americans. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 69(3), 461–469. <https://doi.org/10.1093/geronb/gbu020>

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